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EXAMINER	
MCDOWELL, JR, MAURICE L	
ART UNIT	PAPER NUMBER
2628	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/580,310	COLLOMB, CEDRICK STANISLAS	
	Examiner	Art Unit	
	MAURICE MCDOWELL, JR	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 13-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9, 13-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 3/23/2009 have been fully considered but they are not persuasive.

2. Applicant argues: Initially, at a basic level, Voorhies discloses a technique for generating reflection vectors to index an existing environment map, such as a known cubic map. The independent claims of the present application relate to a different, earlier, stage in the process - in particular, to the generation of a new type of environment map itself. Therefore, Voorhies, at least, does not disclose the first line of Claim 1, nor does it disclose the last two lines of Claim 1.

3. Examiner argues: Voorhies, does disclose the first line of Claim 1, see col. 9 lines 24-27 (The present invention provides a method and an apparatus for generating reflection vectors without vector normalization and for using these reflection vectors to index a three dimensional environment map) and discloses the last two lines of Claim 1 see col. 12 lines 24-31 (At step 620, the R, and Rz 25 components are divided by the magnitude of the R, component to determine the indexed location on the x equals one face of the environment map (which in this example is at y=0.4 and z=-0.8). The values for the indexed location on the indexed face are then used in the conventional manner to 30 retrieve the appropriate shading values from the indexed face of the map. The indexed location on the selected 2-D map can then be supplied to conventional texture mapping algorithms or devices, which then determine the surface shading attributes 35 for the pixel representing displayed point P on the display device. For example, the texture mapping device could determine the pixel shading attributes by averaging the intensity values within the indexed region of the indexed face of the 2-D map).

4. Applicant argues: The Office Action appears to be equating the "raw" reflection vector (Rx, Ry, Rz) in Voorhies (col. 11, lines 41--32) to the "modified" reflection vector that is derived from it (col. 12, lines 24-28 and col. 13, lines 61-65). The Office Action also appears to be equating the "viewing direction vector" of Claim 1 to the Eye vector E in Voorhies; and the "folded vector" of Claim 1 to the modified reflection vector. Applicant disagrees with these alleged correspondences for the following reasons: The modified reflector vector of Voorhies is derived as a vector product of E and the normal vector N, followed by some internal manipulation (dividing one or more vector components of the raw reflection vector by numbers derived from other vector components). In contrast, Claim 1 defines the folded vector as follows: A. it "passes through the map origin" - this may have an analogy with the cubic and octahedral maps of Voorhies. B. it is associated with "an environment position in the three dimensional environment" for which Applicant sees no equivalent in Voorhies - because Voorhies is not concerned with generating map properties in respect of a 3-D environment. C. it lies in "a plane containing both the viewing direction and the environment position" - because there is no analogy in Voorhies to the environment position, this feature is not found in Voorhies. D. it forms "an angle with the viewing direction vector that is a predetermined function of the angle between the viewing direction vector and a vector between the map origin and the environment position" - because there is no environment position defined, this feature is not found in Voorhies. E. it forms an association between a map position and the environment position -again, because there is no environment position defined, this feature is not found in Voorhies. Therefore, it is respectfully submitted that most of the recitation of Claim 1, relating to the definition of the folded vector, is not found in Voorhies.

5. Examiner argues: Voorhies is concerned with generating map properties in respect of a 3-D environment see col. 11 lines 29-33 (… using these reflection vectors to index locations on a cubic environment map (3D) which is aligned with the coordinate system (2D) which specifies the reflection vector) this argument can apply as well to arguments A-E.

6. Applicant argues: It is respectfully submitted that the multiplier 1325 merely provides a x2 function in the calculation of the expression R = 2*N*(N.E)-E*(N.N) (Voorhies col. 11, line 47), as such it is just a scaling factor in an arbitrarily selected equation - it is not a predetermined function relating the folded vector to the other quantities, as recited in Claim 1.

7. Examiner argues: It is a predetermined function relating the folded vector to the other quantities see fig. 12, 1525 and col. 16 lines 9-20 (These multipliers in turn generate the indexed location on the indexed face of the cubic environment map by multiplying the two minor coordinates by the output of the divider).

8. Applicant argues: With respect to Claim 3, contrary to what is alleged in the Office Action that 1320 of Figure 11 in Voorhies is a multiplication by 0.5; it is submitted that 1320 multiples E by (N'N).

9. Examiner argues: See fig. 12, 1525 col. 16 lines 16-19 (The multipliers could multiply by 1/2 or the divider could divide by 2 yielding the same result).

10. Applicant argues: Looking at Cerny, again this is an arrangement for applying (rather than generating) an environment map. Figure 3 of Cerny shows a map origin (point P 305) and a relationship between a viewing direction (vector e, referred to as an observation vector) and a reflection vector (vector r). That is all.

11. Examiner argues: Cerny does teach generating an environment map, see [0030] (The method then processes the reflection vector r to generate texture coordinates (s, t) for each point P).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 1-9, 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Voorhies et al. Patent No.: 5,704,024 in view of Cerny et al. Pub. No.: US 2003/0112238 A1.

14. Regarding claim 1, Voorhies teaches: A method performed by a computer of forming a two dimensional map of a three dimensional environment, there being a map origin located in the three dimensional environment, a viewing direction vector defined passing through the map origin, and a one-to-one correspondence between map positions in the map and the directions of vectors passing through the map origin; the method comprising the steps of: associating by the computer an environment position in the three dimensional environment with a folded vector that passes through the map origin, the folded vector lying in a plane containing both the viewing direction vector and the environment position and forming an angle with the viewing direction vector that is a predetermined function of the angle between the viewing direction vector and a vector between the map origin and the environment position (fig. 9) (R is the folded vector

because Rx and Ry components are divided by the magnitude of the sum of the reflection vector components (i.e., divided by 5.5) to determine the indexed location on face four of the environment map, also R passes through the origin and forms an angle with the viewing direction vector E); and deriving by the computer properties for a map position from the properties of the corresponding environment position (fig. 6 see also col. 12 lines 13-31).

15. Voorhies doesn't teach: associating by the computer an environment position with the map position corresponding to the direction of the folded vector associated with that environment position.

16. The analogous prior art Cerny teaches: associating by the computer an environment position with the map position corresponding to the direction of the folded vector associated with that environment position (fig. 3 see also [0030]) for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

17. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine associating by the computer an environment position with the map position corresponding to the direction of the folded vector associated with that environment position as shown in Cerny with Voorhies for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

18. Regarding claim 2, Voorhies teaches: A method, in which the predetermined function is a multiplication by a predetermined quantity (fig. 12, 1525 see also col. 16 lines 9-20).

19. Regarding claim 3, Voorhies teaches: A method, in which the predetermined function is a multiplication by 0.5 (fig. 12, 1525 see also col. 16 lines 16-19).

20. Regarding claim 4, Voorhies teaches: A method, in which the one-to-one correspondence of a map point with the direction of a vector through the map origin represents a projection onto a predetermined plane of a point on the vector which is a predetermined distance from the map origin (fig. 6).

21. Regarding claim 5, Voorhies teaches: A method, in which the predetermined plane is a plane orthogonal to the viewing direction vector (fig. 6).

22. Regarding claim 6, Voorhies teaches: An image rendering method comprising the steps of: generating a two dimensional map of a three dimensional environment (fig. 4, 512); for a point of interest on an object to be displayed, deriving a reflection vector in dependence on a normal vector at the point of interest and a direction of view (fig. 4, 510); referencing a position in the two dimensional map using the reflection vector, to detect environmental properties at that map position (fig. 6).

23. Voorhies doesn't teach: varying the appearance of the object at the point of interest in dependence on the detected environmental properties.

24. The analogous prior art Cerny teaches: varying the appearance of the object at the point of interest in dependence on the detected environmental properties (fig. 4, 430) for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection

pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

25. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine varying the appearance of the object at the point of interest in dependence on the detected environmental properties as shown in Cerny with Voorhies for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

26. Regarding claim 7, Voorhies doesn't teach: A method, in which the varying step is performed in dependence on a reflectivity of the object at the point of interest.

27. The analogous prior art Cerny teaches: A method, in which the varying step is performed in dependence on a reflectivity of the object at the point of interest (fig. 4, 430) for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

28. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the varying step is performed in dependence on a reflectivity of the object at the point of interest as shown in Cerny with Voorhies for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection pattern, and that is

consistent with results of the direct normal projection method for particular object-observer geometries.

29. Regarding claim 8, Voorhies doesn't teach: A method in which the environmental properties represent lighting properties.

30. The analogous prior art Cerny teaches: A method in which the environmental properties represent lighting properties (fig. 4, 415) for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

31. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the environmental properties represent lighting properties as shown in Cerny with Voorhies for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

32. Regarding claim 9, Voorhies doesn't teach: A computer-readable medium having instructions stored therein which when executed, cause a computer to perform the method.

33. The analogous prior art Cerny teaches: A computer-readable medium having instructions stored therein which when executed, cause a computer to perform the method (fig. 2, 210) for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic

reflection pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

34. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine computer-readable medium having instructions stored therein which when executed, cause a computer to perform the method as shown in Cerny with Voorhies for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

35. Regarding claim 13, Voorhies teaches: Apparatus for forming a two dimensional map of a three dimensional environment, there being a map origin located in the three dimensional environment, a viewing direction vector defined passing through the map origin, and a one-to-one correspondence between map positions in the map and the directions of vectors passing through the map origin; the apparatus comprising: means for associating an environment position in the three dimensional environment with a folded vector that passes through the map origin, the folded vector lying in a plane containing both the viewing direction vector and the environment position and forming an angle with the viewing direction vector that is a predetermined function of the angle between the viewing direction vector and a vector between the map origin and the environment position (fig. 9); and means for deriving properties for a map position from the properties of the corresponding environment position (fig. 6 see also col. 12 lines 13-31).

36. Voorhies doesn't teach: means for associating an environment position with the map position corresponding to the direction of the folded vector associated with that environment position.

37. The analogous prior art Cerny teaches: means for associating an environment position with the map position corresponding to the direction of the folded vector associated with that environment position (fig. 3 see also [0030]) for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

38. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine means for associating an environment position with the map position corresponding to the direction of the folded vector associated with that environment position as shown in Cerny with Voorhies for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

39. Regarding claim 14, Voorhies teaches: An image rendering apparatus comprising: map generating apparatus (fig. 3, 410); means for deriving a reflection vector, in respect of a point of interest on an object to be displayed, in dependence on a normal vector at the point of interest and a direction of view (fig. 4, 510); means for referencing a position in the two dimensional map using the reflection vector, to detect environmental properties at that map position (fig. 6).

40. Voorhies doesn't teach: means for varying the appearance of the object at the point of interest in dependence on the detected environmental properties.

41. The analogous prior art Cerny teaches: means for varying the appearance of the object at the point of interest in dependence on the detected environmental properties (fig. 4, 430) for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

42. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine means for varying the appearance of the object at the point of interest in dependence on the detected environmental properties as shown in Cerny with Voorhies for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

43. Regarding claim 15, Voorhies doesn't teach: A video game machine comprising apparatus.

44. The analogous prior art Cerny teaches: A video game machine comprising apparatus (fig. 2, 200) for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

45. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine video game machine comprising apparatus as shown in Cerny with Voorhies for the benefit of to implement a system and method of environment mapping that depends upon an observer's location with respect to an object's location and orientation to generate a more realistic reflection pattern, and that is consistent with results of the direct normal projection method for particular object-observer geometries.

Conclusion

46. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MAURICE MCDOWELL, JR whose telephone number is (571)270-3707. The examiner can normally be reached on Mon-Friday 7:30am - 5:00pm Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Xiao Wu can be reached on 571--272-7761. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MM

/XIAO M. WU/
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